# LANcat™ System 6 with C5e Performance Module

*User Manual Addendum*

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## LANcat System 6 Introduction

LANcat System 6 consists of a pair of LANcat testers equipped with 250 MHz C5e Performance Modules. The C5e Performance Modules take Category 5 testing beyond current Category 5 standards of 100 MHz, providing critical information for Enhanced Category 5 and Gigabit cabling. System 6 offers an unequalled combination of power, measurement precision, ease of use, and low ownership cost. This unique modular design makes LANcat the most versatile tester on the market.

In addition to being fully compliant with TIA TSB 67 requirements for certifying CAT 5/Class D links, the LANcat System 6 performs several important new measurements including Power Sum Near End Crosstalk (PS-NEXT) and Power Sum Attenuation-to-Crosstalk Ratio (PS-ACR) to 250 MHz. Modules provide Equal Level Far End Crosstalk (ELFEXT), PS ELFEXT, and Return Loss testing as required in the proposed Enhanced Category 5 standard, to 100 MHz.

Padded protective overcases supplied with the system enclose both the tester and performance module, providing protection from damage in the field while allowing full access to the display and all controls.

The LANcat System 6 with C5e Performance Modules fully complies with the proposed TIA Level IIe accuracy specifications.

This manual only describes features and operation specific to LANcat Handsets equipped with C5e Performance Modules. Please refer to the LANcat Series Cable Testers User Manual for general operation, maintenance, and specifications.

### *Enhanced Test Specifications*

The following 100 MHz Certification Standards can be extended to 250 MHz for verification purposes.

- TSB-67 CAT 3, 4, 5
- TIA Category 5e
- TSB-95
- ISO 11801 Class C, D
- EN50173 Class D
- ScTP Class C, D
- AS/NZS 3080 Class C, D
- BICC Millennium
- FTP 120 Ohms
- JIS X 5150

A TwoWay system (two LANcat System 6 testers) is required for 250 MHz tests and all Remote NEXT, ELFEXT, and Return Loss tests. Firmware versions below **6.00** require factory calibration before running 250 MHz tests. Contact Datacom Textron for factory calibration details.

Cable Grading is not available for firmware versions **6.00 D3/D4** or higher. Cable grading has been superceded by headroom and link performance analysis detail screens.

The following 100 MHz Network Standards can be extended to 250 MHz for verification purposes.

- IEEE 100BASE-Tx
- ANSI X3T9.5 TP-PMD
- ATM 155 MBPS

## Test Reports

Each LANcat tester can store up to 400 test reports (800 total per system).

Test reports can be saved in 3 different formats:

- Encrypted tamper proof Report Manager format.
- Comma Separated Variable for import into spreadsheet programs.
- Text files for import into word processing programs.

## Performance Module Installation

> Make sure the unit is turned **off** before attempting module installation or removal.

To install the C5e Performance Module, slide it into the opening on the LANcat until the screws rest against the retainers, then evenly hand-tighten the screws until the module is properly seated (refer to Figure 1-1). To remove a module, loosen the thumbscrews at either side of the module until the screws are free of the retainers. Hold the module on either side and slide it out of the opening.

### *CAUTION*

*To avoid damage to the LANcat, tighten the screws evenly using finger pressure only. Make sure to turn both screws either simultaneously or alternately in small increments. The module is designed to be installed or removed without tools.*

STATIC AWARENESS

The LANcat contains static sensitive electronics inside the main body. Use appropriate precautions when removing and installing performance modules.

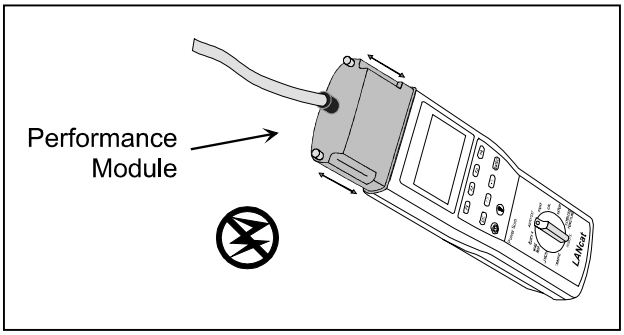



Figure 1-1. Module Installation

## Autotests

Autotest is a preprogrammed suite of tests that are required to certify a cabling link. The following tests are required by TIA/EIA:

- Wire Map
- Near-End Crosstalk (NEXT)
- Attenuation
- Length
- Return Loss (CAT5e)
- ELFEXT (CAT5e)

The following tests may be added to the Autotest suite of tests by defining a Custom Cable standard (see the LANcat User Manual, Appendix A, Defining Custom Standards):

- Delay / Delay Skew
- 250 MHz UTP (100 MHz standards only)
- Power Sum Link Performance
- Power Sum NEXT
- Power Sum ACR
- Resistance
- ACR
- Return Loss
- ELFEXT
- Power Sum ELFEXT

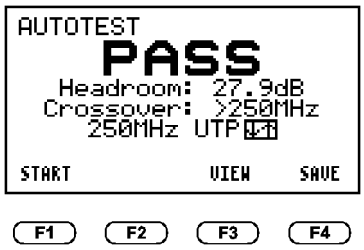
Please note that impedance is not tested when using the C5e Performance Module. The maximum cable length measured by the System 6 is 1100 feet.

### *NOTES ON 250 MHz TESTING*

- *250 MHz testing is available for all 100 MHz tests. This option is available by entering the CHANGE CABLE STANDARD menu and editing the selected test standard. Using this option, the instrument will extend NEXT and ATTENUATION measurements out to 250 MHz.*
- ***PASS or FAIL indications when running Autotest are based on existing 100 MHz test standards.***
- *250 MHz tests can also be enabled by selecting "250 MHz UTP" in the Cable Standard menu.*
- *If the LANcat fails any test, it will stop and display the failure. You may continue testing by pressing the CONTINUE (F4) softkey.*

## *Running Autotest*

1. Connect each tester to the cable under test.
2. Set one tester dial to REMOTE.
3. Set the other tester dial to AUTOTEST.
4. Use the up/down arrow keys to enter the CHANGE CABLE STANDARD menu.
5. Use the up/down arrow keys to highlight the desired Cable Standard. Press SELECT (F4) to update both testers to the chosen standard. The test will run automatically.
6. After completing an Autotest, press START (Fl) to re-start Autotest. Press VIEW (F3) to review the test results. Press SAVE (F4) or ENTER to save the test results.



## *Viewing 250 MHz Autotest Results*

After performing an Autotest, LANcat will display PASS, FAIL or PASS*, FAIL*. LANcat also displays Headroom and Crossover.

Headroom (expressed in Decibels or dB) is based on the worst case measurement of Power Sum NEXT relative to the NEXT standard for the cable test chosen. Crossover value (in MHz) is the frequency at which Power Sum ACR equals zero (*PSNEXT-Attenuation = PSACR*)

Two new System 6 test summary screens are shown after an Autotest: Link Performance and Power Sum ACR.

### Viewing Test Results

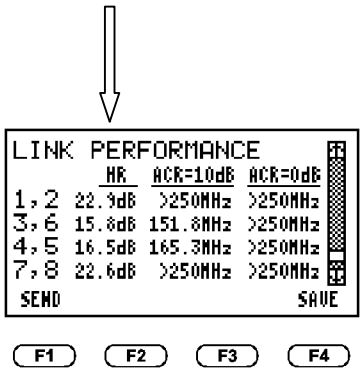
1. After completing Autotest, press VIEW (F3) from the Autotest results screen.
2. Press the arrow keys to view additional summary test result screens (Link Performance and PSACR are shown after the NEXT results).
3. Press SAVE (F4) or ENTER at any time to save the Autotest results.
4. Press GRAPH (F2) to view a graphic display of the test results.
5. Press SEND (F1) to send the results to the Remote Unit.
6. Press ESC to exit View.

## Link Performance Screen

The Link Performance screen provides additional cable performance information. This screen displays Headroom (HR) and the Power Sum Attenuation to Crosstalk Ratio (PS-ACR) for all four wire pairs.

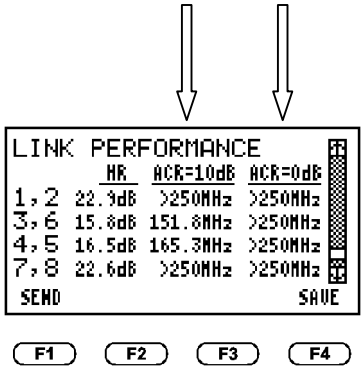
### Headroom

Headroom (HR) is displayed in Decibels (dB) and indicates the measured difference between actual cable performance and current Category 5 standards. A high dB value for Headroom indicates a level of performance greater than Cat 5.



## Power Sum ACR

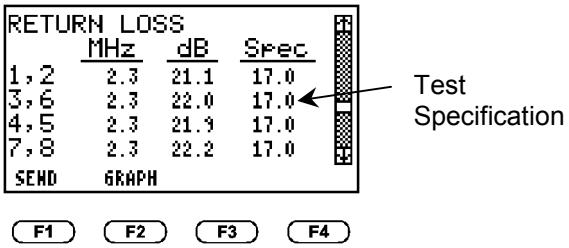
Power Sum Attenuation to Crosstalk Ratio (PS-ACR) is displayed two ways. The column ACR=10 dB indicates the frequency at which the pair tested had an ACR value of 10 dB. This is generally accepted to be the useable bandwidth of the cable while still having enough signal strength to guarantee low data transmission error rates. The column ACR=0 dB indicates the frequency at which ACR measured zero. This zero point is considered the absolute maximum useable bandwidth of the cable.



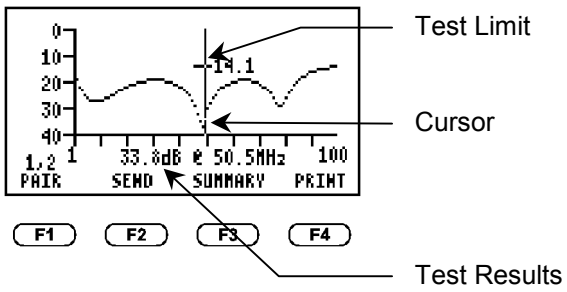
## Return Loss

Return Loss is a measure of the reflected energy caused by impedance mismatches in the cabling system. Return Loss is expressed as the ratio, in dB, of the incident power and reflected power. Since it is desirable to have the least amount of energy reflected, larger values are desirable. Return Loss is especially important for applications such as Gigabit Ethernet that use simultaneous bi-directional transmission. Return Loss measurements are made to 100 MHz as required in the proposed Enhanced Category 5 specification.

## Viewing Return Loss Results




Press GRAPH (F2) to view a graph of Return Loss results.




## Return Loss Reporting

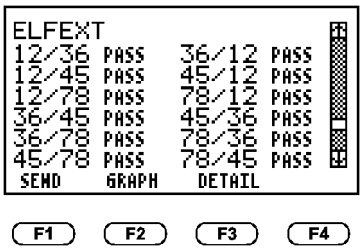
Return Loss measurements for Enhanced Category 5 are being added to TIA/EIA 568-A via Standards Proposal 4195-A. When this proposal is adopted, standard 568-A will be amended as 568-A-5. At this point in time, the committee developing Proposal 4195 is still debating the standards for devices measuring return loss and the return loss limits for installed cabling. Since actual requirements are still under debate, return loss is reported for informational value only. Standards that require return loss measurements will not be failed based on return loss measurements.

## ELFEXT

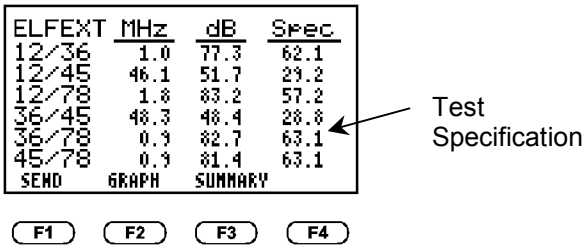
Equal Level Far End Crosstalk or ELFEXT is derived from Far End Crosstalk (FEXT) measurements and attenuation measurements. FEXT is a measure of the unwanted signal from a transmitter at the near-end into a neighboring pair at the far-end. ELFEXT is expressed in dB as the difference between the measured FEXT and the attenuation of the disturbed pair. Power Sum ELFEXT takes into account the combined crosstalk on a receive pair from all the far end disturbers operating simultaneously. ELFEXT measurements are made to 100 MHz as required in the proposed Enhanced Category 5 specification.

### Viewing ELFEXT Results

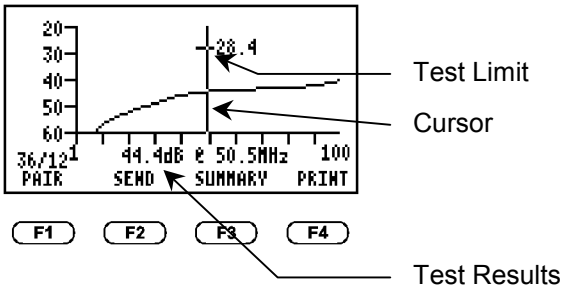
Test Summary




Press DETAIL (F3) to view ELFEXT test specifications.

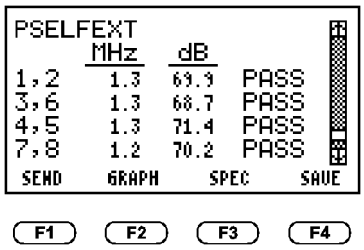



Press GRAPH (F2) to view a graph of ELFEXT Results

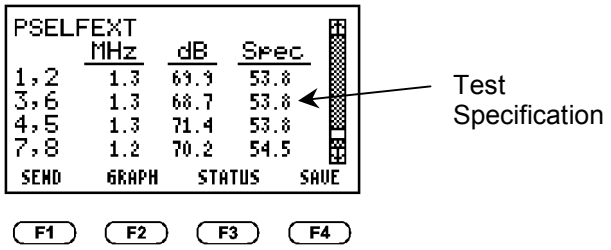


## Viewing Power Sum ELFEXT Results

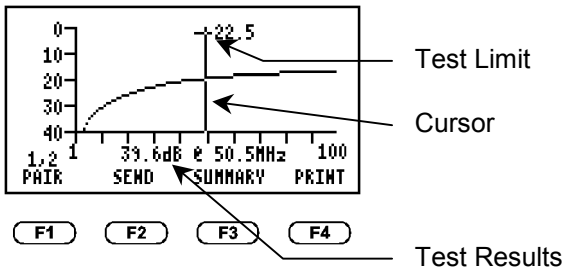
Test Summary




Press SPEC (F3) to view PS ELFEXT test specifications.



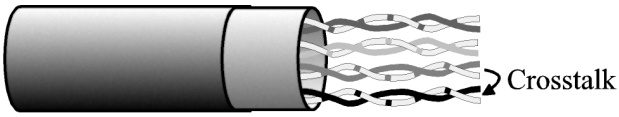

Press GRAPH (F2) to view a graph of PS ELFEXT Results.


0
10
20
30
40
22.5
1
100
1/2
PAIR
SEND
SUMMARY
PRINT
F1
F2
F3
F4
Test Limit
Cursor
Test Results

# Certifying Category 5 Cabling

## Pair-to-Pair NEXT Method

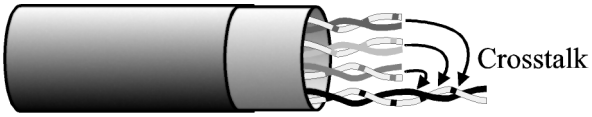
NEXT, as defined in TIA TSB-67, is a measure of signal coupling from one pair to another pair within the four-pair cable. It is also sometimes called pair-to-pair NEXT. TSB-67 requires that pair-to-pair NEXT be measured on all six pair combinations, and that the worst pair-to-pair NEXT measurement not exceed specified test limits for the Basic Link or Channel test configurations.



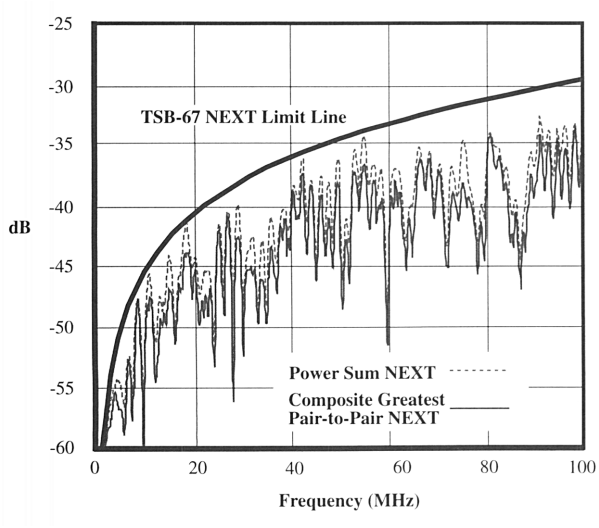

The pair-to-pair NEXT measurements, however, only account for crosstalk coupled from any one pair to another - not the possible total crosstalk that might be coupled from multiple pairs in the same sheath. The TSB-67 methodology assumes that only two pairs of the cable would be used at any given time for data transmission. While pair-to-pair NEXT is an appropriate crosstalk measure for 2-pair network schemes, such as 10BASE-T and 100BASE-Tx, it does not provide an adequate measure of cable performance when multiple pairs within the same sheath may be transmitting simultaneously, such as in Gigabit Ethernet.

## Power Sum NEXT Method

Power Sum NEXT (PS-NEXT) is the sum of the NEXT power coupled to a wire pair from all other adjacent pairs. Power Sum is specified by TIA 568A as the recommended method for characterizing NEXT of multipair backbone cable. PS-NEXT can be computed from the individual pair-to-pair NEXT measurements.




The graph below shows the computed PS-NEXT for a typical CAT 5 link, compared to a composite curve representing the greatest (i.e. closest to the TSB-67 NEXT limit) pair-to-pair NEXT values for the same link. As seen from this example, the PS-NEXT values are always worse than the greatest pair-to-pair NEXT values. In fact, PS-NEXT for four-pair cabling can be as much as 4.77 dB worse than the greatest pair-to-pair NEXT measurement. A link that easily passes TSB-67 Category 5 pair-to-pair NEXT requirements might therefore fail if PS-NEXT is used as the measure.

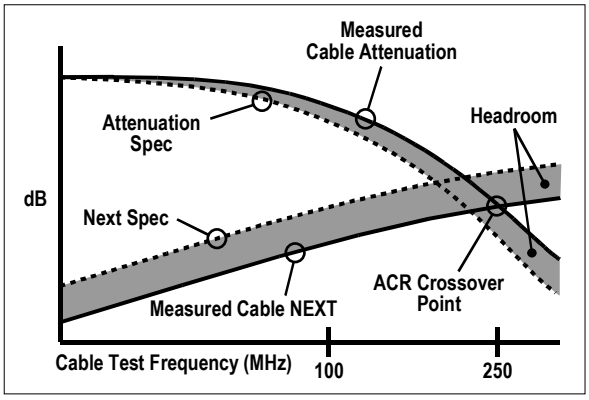



Several manufacturers of enhanced-performance CAT 5 cables and connectors specify PS-NEXT as a measure of product performance. Because PS-NEXT is a more stringent NEXT characterization method, components that are specified and tested to meet Power Sum are more likely to deliver optimum performance, even beyond TIA 568A defined CAT 5 requirements.

## Link Performance Analysis Beyond 100 MHz – ACR and Headroom

Power Sum ACR measurements beyond 100 MHz are valuable for determining adequate performance of enhanced Cat 5 cabling. Current Cat 5 standards require a minimum of 10 dB ACR at 100 MHz. Proposed Cat 6 standards recommend an ACR value of a minimum 10 dB ACR at 200 MHz.

System 6 provides this measure of cable performance up to 250 MHz. The frequency at which the cable had a measured 10 dB ACR value is clearly displayed in the LINK PERFORMANCE screen. The following graph illustrates the ACR vs. Frequency relationship:



## Test Reports

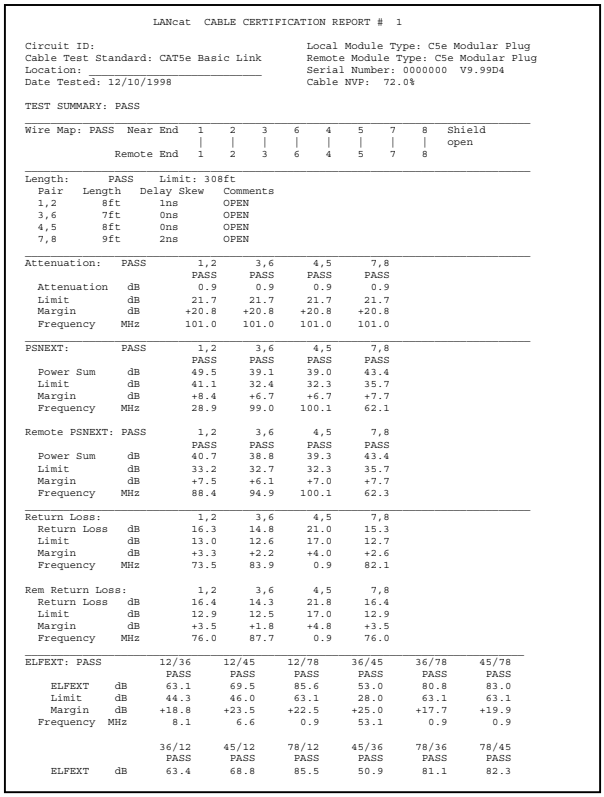
Up to 400 test reports can be saved in each LANcat System 6 tester. Reports can be uploaded to a PC and viewed or printed with the Report Manager software.

Please refer to Chapter 6 in the LANcat Series Cable Testers User Manual for more information on working with reports.

# Sample 250 MHz UTP Autotest Report

```
                    LANcat  CABLE CERTIFICATION REPORT #  1

Circuit ID:                                  Local Module Type: C5e Modular Plug
Cable Test Standard: CAT5EN Basic Link       Remote Module Type: C5e Modular Plug
Location:                                    Serial Number: 1111111  V9.99D4
Date Tested: 11/04/1998                      Cable NVP:  72.0%

TEST SUMMARY: PASS

Wire Map: PASS  Near End   1    2    3    6    4    5    7    8   Shield
                           |    |    |    |    |    |    |    |   open
                Remote End 1    2    3    6    4    5    7    8

Length:      PASS    Limit: 308ft
  Pair   Length   Delay Skew   Comments
  1,2       8ft       1ns       OPEN
  3,6       8ft       0ns       OPEN
  4,5       8ft       0ns       OPEN
  7,8       9ft       2ns       OPEN

Attenuation:   PASS          1,2       3,6       4,5       7,8
                           PASS      PASS      PASS      PASS
  Attenuation   dB          1.1       1.0       1.0       0.9
  Limit         dB         21.7      21.7      21.5      21.7
  Margin        dB        +20.6     +20.7     +20.5     +20.8
  Frequency     MHz       101.0     101.0      99.0     101.0

PSNEXT:        PASS          1,2       3,6       4,5       7,8
                           PASS      PASS      PASS      PASS
  Power Sum     dB          41.0      39.0      39.6      42.0
  Limit         dB          33.3      32.5      32.3      35.9
  Margin        dB          +7.7      +6.5      +7.3      +6.1
  Frequency     MHz         86.8      97.6     100.1      60.5

Remote PSNEXT: PASS          1,2       3,6       4,5       7,8
                           PASS      PASS      PASS      PASS
  Power Sum     dB          41.1      41.3      39.9      41.8
  Limit         dB          33.3      35.0      32.3      35.9
  Margin        dB          +7.8      +6.3      +7.6      +5.9
  Frequency     MHz         87.0      68.6     100.1      60.5

Return Loss:                 1,2       3,6       4,5       7,8
  Return Loss   dB          19.9      15.5      21.0      15.4
  Limit         dB          17.0      12.5      17.0      12.9
  Margin        dB          +2.9      +3.0      +4.0      +2.5
  Frequency     MHz          0.9      87.3       0.9      76.9

Rem Return Loss:             1,2       3,6       4,5       7,8
  Return Loss   dB          19.8      15.6      19.9      15.4
  Limit         dB          17.0      12.5      17.0      12.7
  Margin        dB          +2.8      +3.1      +2.9      +2.7
  Frequency     MHz          0.9      86.6       0.9      81.2
```

# Sample C5e Autotest Report



```
                    LANcat  CABLE CERTIFICATION REPORT #  1

Circuit ID:                                  Local Module Type: C5e Modular Plug
Cable Test Standard: CAT5e Basic Link        Remote Module Type: C5e Modular Plug
Location: _____________________              Serial Number: 0000000  V9.99D4
Date Tested: 12/10/1998                      Cable NVP:  72.0%

TEST SUMMARY: PASS

Wire Map: PASS  Near End   1    2    3    6    4    5    7    8   Shield
                           |    |    |    |    |    |    |    |   open
                Remote End 1    2    3    6    4    5    7    8

Length:       PASS     Limit: 308ft
  Pair    Length    Delay Skew    Comments
  1,2       8ft       1ns         OPEN
  3,6       7ft       0ns         OPEN
  4,5       8ft       0ns         OPEN
  7,8       9ft       2ns         OPEN

Attenuation:   PASS          1,2       3,6       4,5       7,8
                            PASS      PASS      PASS      PASS
  Attenuation    dB          0.9       0.9       0.9       0.9
  Limit          dB         21.7      21.7      21.7      21.7
  Margin         dB        +20.8     +20.8     +20.8     +20.8
  Frequency     MHz        101.0     101.0     101.0     101.0

PSNEXT:        PASS          1,2       3,6       4,5       7,8
                            PASS      PASS      PASS      PASS
  Power Sum      dB         49.5      39.1      39.0      43.4
  Limit          dB         41.1      32.4      32.3      35.7
  Margin         dB         +8.4      +6.7      +6.7      +7.7
  Frequency     MHz         28.9      99.0     100.1      62.1

Remote PSNEXT: PASS          1,2       3,6       4,5       7,8
                            PASS      PASS      PASS      PASS
  Power Sum      dB         40.7      38.8      39.3      43.4
  Limit          dB         33.2      32.7      32.3      35.7
  Margin         dB         +7.5      +6.1      +7.0      +7.7
  Frequency     MHz         88.4      94.9     100.1      62.3

Return Loss:                 1,2       3,6       4,5       7,8
  Return Loss    dB         16.3      14.8      21.0      15.3
  Limit          dB         13.0      12.6      17.0      12.7
  Margin         dB         +3.3      +2.2      +4.0      +2.6
  Frequency     MHz         73.5      83.9       0.9      82.1

Rem Return Loss:             1,2       3,6       4,5       7,8
  Return Loss    dB         16.4      14.3      21.8      16.4
  Limit          dB         12.9      12.5      17.0      12.9
  Margin         dB         +3.5      +1.8      +4.8      +3.5
  Frequency     MHz         76.0      87.7       0.9      76.0

ELFEXT: PASS              12/36     12/45     12/78     36/45     36/78     45/78
                           PASS      PASS      PASS      PASS      PASS      PASS
    ELFEXT     dB         63.1      69.5      85.6      53.0      80.8      83.0
    Limit      dB         44.3      46.0      63.1      28.0      63.1      63.1
    Margin     dB        +18.8     +23.5     +22.5     +25.0     +17.7     +19.9
  Frequency   MHz          8.1       6.6       0.9      53.1       0.9       0.9

                          36/12     45/12     78/12     45/36     78/36     78/45
                           PASS      PASS      PASS      PASS      PASS      PASS
    ELFEXT     dB         63.4      68.8      85.5      50.9      81.1      82.3
```

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Limit | dB | 44.3 | 46.0 | 63.1 | 28.0 | 63.1 | 63.1 |
| Margin | dB | +19.1 | +22.8 | +22.4 | +22.9 | +18.0 | +19.2 |
| Frequency | MHz | 8.1 | 7.2 | 0.9 | 69.9 | 0.9 | 0.9 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Remote ELFEXT: | PASS | 12/36 | 12/45 | 12/78 | 36/45 | 36/78 | 45/78 |
| | | PASS | PASS | PASS | PASS | PASS | PASS |
| ELFEXT | dB | 63.1 | 69.5 | 85.6 | 53.0 | 80.8 | 83.0 |
| Limit | dB | 44.3 | 46.0 | 63.1 | 28.0 | 63.1 | 63.1 |
| Margin | dB | +18.8 | +23.5 | +22.5 | +25.0 | +17.7 | +19.9 |
| Frequency | MHz | 8.1 | 6.6 | 0.9 | 53.1 | 0.9 | 0.9 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | | 36/12 | 45/12 | 78/12 | 45/36 | 78/36 | 78/45 |
| | | PASS | PASS | PASS | PASS | PASS | PASS |
| ELFEXT | dB | 63.4 | 68.8 | 85.5 | 50.9 | 81.1 | 82.3 |
| Limit | dB | 44.3 | 46.0 | 63.1 | 28.0 | 63.1 | 63.1 |
| Margin | dB | +19.1 | +22.8 | +22.4 | +22.9 | +18.0 | +19.2 |
| Frequency | MHz | 8.1 | 7.2 | 0.9 | 69.9 | 0.9 | 0.9 |

| | | | | | |
|---|---|---|---|---|---|
| PSELFEXT: | PASS | 1,2 | 3,6 | 4,5 | 7,8 |
| | | PASS | PASS | PASS | PASS |
| Power Sum | dB | 70.6 | 69.4 | 72.5 | 69.4 |
| Limit | dB | 60.4 | 60.4 | 60.4 | 60.4 |
| Margin | dB | +10.2 | +9.0 | +12.1 | +9.0 |
| Frequency | MHz | 1.2 | 1.2 | 1.2 | 1.2 |

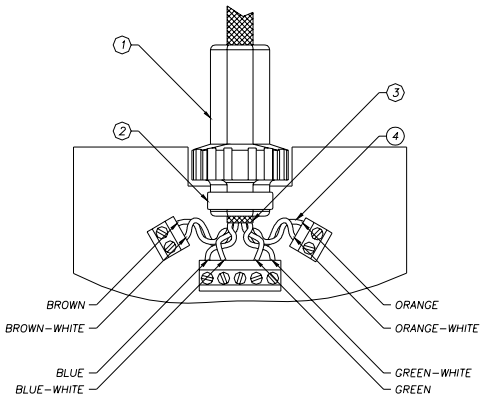
| | | | | | |
|---|---|---|---|---|---|
| REM PSELFEXT: | PASS | 1,2 | 3,6 | 4,5 | 7,8 |
| | | PASS | PASS | PASS | PASS |
| Power Sum | dB | 70.6 | 69.4 | 72.5 | 69.4 |
| Limit | dB | 60.4 | 60.4 | 60.4 | 60.4 |
| Margin | dB | +10.2 | +9.0 | +12.1 | +9.0 |
| Frequency | MHz | 1.2 | 1.2 | 1.2 | 1.2 |

Operator: _____ Date: _____

Comments: END REPORT #1

## Performance Module Cable Replacement

The performance module test cable can be field replaced should the part become worn or damaged.




Steps:

1. Remove module from main unit (unit off).
2. Remove Philips screws holding module halves together.
3. Slide top cover of module off lower portion.
4. Cut zip tie (2).

5. Loosen the screws on the cable terminal blocks and remove the wires.
6. Remove the black grommet (1) from the old cable.
7. Remove the module cover from the old cable.
8. Install the module cover onto the new cable.
9. Install the grommet onto the new cable and position it as shown (1).
10. Insert the stripped wire ends (4) of the replacement cable into the terminal blocks. Make sure to note the proper position and color codes of the wires.

Note*: The factory cable is wired as per T568B. It is possible to use a T568A test cable if the module is wired accordingly. To wire the module to T568A, swap the positions of the orange/orange-white and green/green-white wire pairs.*

Tighten the terminal block screws.

11. Position the grommet as shown and fasten into place using new zip tie (2). Make sure the grommet is positioned as shown (3).
12. Slide the module cover back into place and fasten using screws provided. Do not overtighten.
13. Insert module back into main unit.

It is recommended that a Performance Module calibration be performed after replacing the cable.

**NOTE:**

To achieve optimum performance, advanced cabling systems manufacturer's recommend the use of their products for the complete end-to-end system. Accordingly, maximum test accuracy can only be achieved by using a System 6 patch cable that is of the same type as the cabling being tested.

## Technical Support

Datacom Textron offers unlimited free technical support for LANcat customers. If you have questions or comments, contact your sales representative or distributor, or call Datacom Textron and ask for technical support. Hours are Monday through Friday, 8 AM to 5:00 PM Pacific Time.

| | |
|---|---|
| US and Canada | 800-468-5557<br>425-355-0590 |
| International | 425-355-0590 |
| Fax | 425-290-1600 |
| Web Site | www.datacom.textron.com |

# Warranty

### *User-Guard™ Support Program*

Datacom Textron provides the following services and benefits to LANcat System 6 owners.

**Calibration Services** - Annual re-calibration services by a Datacom Textron certified service center for two years (United States only).

**Priority Cross-Shipments** - If a Datacom Textron product ever requires factory service or repair, Datacom Textron offers next-day exchange or loan of a replacement unit (United States only).

**Technical Support Hotlines** - Unlimited access to Datacom Textron's staff of knowledgeable Application Engineers for questions on product usage and applications. Contact may be made a toll-free service line, dedicated email support line, or the Datacom Textron Web site.

**Training** - A variety of self-training instructional materials are available to assist users in the proper use and application of Datacom Textron instruments. These include technical notes, application notes, quick-reference guides, and tutorial handbooks. These materials may be ordered from the Datacom Textron Web site.

**Product Updates/Upgrades** - Product firmware upgrades are made available at no extra charge from the Datacom Textron Web site at www.datacom.textron.com.

### *Two Year Product Warranty*

The LANcat System 6 is warranted against defects in materials and workmanship within a period of two (2) years following the date of purchase of the tester.

Any instrument claimed to be defective during the warranty period should be returned to Datacom Textron's Factory Service Center. Refer to the chapter on Technical Support and Service for further instructions.

ANY IMPLIED WARRANTIES ARISING OUT OF THE SALE OF A LANCAT SYSTEM 6 CABLE TESTER, INCLUDING BUT NOT LIMITED TO IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, ARE LIMITED IN DURATION TO THE ABOVE STATED TWO (2) YEAR PERIOD. DATACOM TEXTRON SHALL NOT BE LIABLE FOR LOSS OF USE OF THE TESTER OR OTHER INCIDENTAL OR CONSEQUENTIAL DAMAGES, EXPENSES OR ECONOMIC LOSS.

Some states and countries do not allow limitations on how long implied warranties last or the exclusions or limitation of incidental or consequential damages, so the above limitations or exclusions may not apply to you. This warranty gives you specific legal rights, and you may also have other rights which vary from state to state.

Datacom Textron certifies that this instrument was thoroughly tested and found to meet its published specifications when shipped from the factory.